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A CORRECTION CONCERNING THE LIFE ZONES OF CANADA.

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A great step forward in the study of North American biota was taken when Merriam ('94) divided the continent into life zones and faunal areas on the basis of temperature. His divisions were natural ones and have been widely adopted, though they have been objected to by some botanists who have, however, given us nothing better, or as good. Subsequently several faunal maps of North America have appeared, founded mainly on that of Merriam ('98), and in some of these, notably that of Seton ('09), faunal areas not previously recognized are marked.

All the faunal maps of North America that I have seen are inaccurate in regard to one particular of which I happen to have special knowledge—the border-line between the Transition and Canadian Zones in Ontario. In Merriam's and Seton's maps the top of the Bruce Peninsula is indicated as being in the Canadian Zone, and the line between the Canadian and Transition is a little too low at the point where it touches Georgian Bay. In the American Ornithological Union map (1910) not only the whole of the Bruce Peninsula but a good deal of Central Ontario is indicated as Canadian.

The data which I here make use of in showing the true faunal position of the Bruce Peninsula was obtained while engaged in biological work on the peninsula in 1905, '07, '08, '09, '10, '11, '12 and '15, and that concerning the position of the boundary between the two zones in the vicinity of Georgian Bay was obtained on a motor-boat trip round the bay in 1912, when I camped at various points on the shore, and at Lake of Bays, Muskoka, in 1916. Work done in the vicinity of Ottawa in 1917 confirms the position of the line between the two zones as given by Merriam and Seton.

The Transition Zone, as its name implies, is a region of inter-

gradation between the Canadian and Upper Austral Zones, and is not characterized by a number of species peculiar to itself but by a fauna and flora made up of southern and northern elements. The Canadian Zone, on the other hand, is characterized by many species. It is forested with coniferous trees, in the east mainly with white spruce (*Picea canadensis*), red spruce (*Picea rubra*) and jack pine (*Pinus banksiana*).

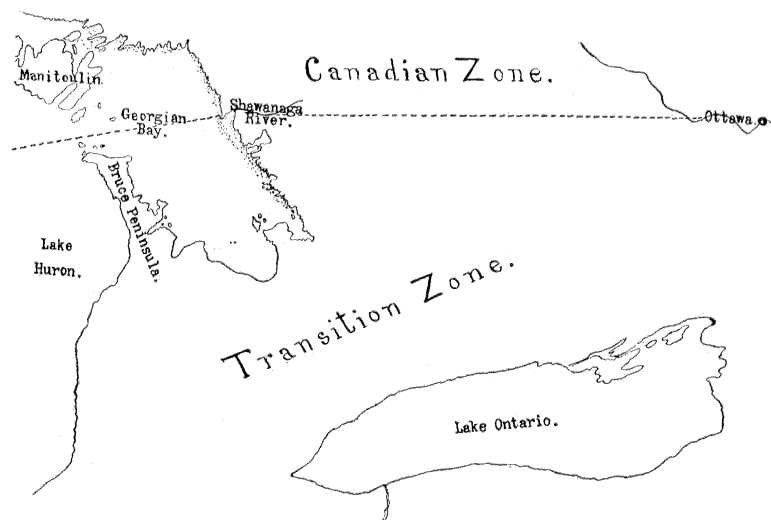
Among the characteristic mammals are the Canada lynx, marten, Canada porcupine, varying hare, northern red squirrel, star-nosed mole, northern flying-squirrel and northern jumping-mouse, and among birds the spruce grouse, arctic three-toed woodpecker, olive-sided flycatcher, Canada jay, American cross-bill, white-throated sparrow, slate-colored junco, Blackburnian warbler, Tennessee warbler, magnolia warbler, bay-breasted warbler, myrtle warbler, olive-backed thrush and hermit thrush.

If any region has a flora and fauna consisting of many Austral species and very few Canadian, it is clearly in the Transition Zone. On the Bruce Peninsula, and on Cove, Bear's Rump, and Flower-pot Islands off the top of the peninsula, white spruce occurs but is scarce, red spruce is absent, and the predominating forest is maple-beech. The following Austral plants, which have an extensive range to the southwest, grow on the peninsula—*Gentiana procera*, *Linum medium*, *Satureja glabra*, *Solidago rigida* and *Cacalia tuberosa*, and also the following species which have an extensive range to the south—*Eleocharis acuminata*, *E. rostellata*, *Scleria verticillata*, *Scirpus lineatus*, *Trillium grandiflorum*, *Viola rostrata*, *Rosa carolina* and *Uvularia perfoliata*. No typical Canadian plants, with the exception of *Carex scirpoides*, occur on the peninsula, as *Linnæa borealis*, *Cornus canadensis*, *Clintonia borealis*, *Maianthemum canadense* and *Streptopus roseus* which are common, and which are sometimes considered Canadian species, extend far south into the Transition. A fuller discussion of the flora of the peninsula will be found in two of my papers (Klugh, '06, '12).

Among mammals it is the southern wild cat and not the northern Canada lynx that occurs on the Bruce Peninsula, and the Austral form of the red squirrel, *Sciurus hudsonicus loquax*, and not the northern *S. hudsonicus*.

The following Austral birds breed on the peninsula—red-headed woodpecker, Baltimore oriole, towhee, indigo bunting, migrant shrike, brown thrasher, catbird, prairie warbler (see Saunders '06, Klugh '09, '10), wood thrush and bluebird, while of the Canadian birds mentioned above only the white-throated sparrow, Blackburnian warbler, myrtle warbler and hermit thrush breed, the two latter being rare as summer residents.

The above data shows conclusively that the Bruce Peninsula is in the Transition Zone.



It is of course obviously impossible to adequately represent the boundaries between life-zones and faunal areas by a sharp line, since the change from one zone or area to another is gradual and not abrupt. But our lines should be drawn through the region where a comparatively few miles north or south shows an appreciable change in the biota. In the case of the line between the Canadian and Transition Zones in Ontario this is certainly not true if the line is drawn through central Ontario, nor is it true if it touches Georgian Bay low down. It is not until we reach the mouth of the Shawanaga River that we have a clearly Canadian fauna and flora to the north and a Transition biota to the south. That the line should be drawn as indicated on the accompanying map is shown by the data given by Fleming ('01) and Wright ('20) as well as by my data.

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